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the body of the work Lamarck tells us many things worthy of careful perusal and thought. While this last chapter, like the biographical introduction, leaves much to be desired, Dr. Packard's volume is so replete with good translations of well-chosen passages from Lamarck that one cannot hesitate in pronouncing it the most complete and truthful statement of Lamarck's views that has thus far appeared in English.

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### ZOÖLOGY.

**Benham on Flatworms.**—The present volume,<sup>1</sup> which is Part IV of Lankester's *Treatise*, is the third of this useful series to make its appearance, and covers, in Chapters XIV to XXI inclusive, the Turbellaria, Temnocephaloidea, Trematoda, Cestoidea, Appendices to the Platyhelminia, and Nemertini. Each chapter opens with a synopsis of the classification adopted for the group, and this is followed by an admirable historical summary, which, though brief, is notably clear, complete, and well balanced. The next section deals with the general characters of the group under consideration, and contains an analysis and discussion of each subdivision in order, closing with a list of the chief works on the group. The "ideal" platyhelminth, exploited in the opening chapter, is rather too generally used to meet the approval of present-day zoölogists, even though it affords an easy standard of comparison for the beginner. It is a great pleasure, however, to see some important theoretical explanations presented in a general text, and that in a clear and attractive manner which serves to make the mass of detail comprehensible. But it may be seriously questioned whether anything is gained by raising to the rank of phylum every group which after intensive study appears to be sharply set off from its nearest of kin.

For Turbellaria the author has used the classification of Lang and von Graff, and has made a happy selection of figures to illustrate the points under consideration. The short chapter on Temnocephaloidea follows Haswell's work very closely and gives the best presentation of this little-known group accessible in any text-book.

Among the Trematoda, Monticelli's classification, as modified by

<sup>1</sup> *Treatise on Zoölogy*. Edited by E. Ray Lankester. Part IV, The Platyhelminia, Mesozoa, and Nemertini. By W. Blaxland Benham, D.Sc., M.A. London, Adams and Black; New York, The Macmillan Company. 204 pp., 114 text-figs.

Braun, has been adopted in the main, although such minor changes as those in the arrangement of the families will hardly be regarded by most helminthologists as an improvement. A few minor errors have crept into the chapter, as the representation (Fig. IX) of the lateral nerve as the chief longitudinal stem, and the denomination of the basement membrane as an internal limiting cuticular membrane.

The classification used for the Cestoidea is a combination of those used by Braun and Lang, to the former of which it is certainly inferior. The use of *Cestoidea merozoa* instead of *Cestoidea polyzoa* Lang is a noteworthy improvement as avoiding the confusion and incorrect inference in the latter term; but why not a single term rather than the cumbersome double form? The arrangement of the families is open to the criticism that no grouping can be considered more than temporary which is based on so artificial a feature as the number of suckers. Both text and literature are deficient in respect to the older work of Cohn and Lühe, and one is struck by the entire omission of references to the very extensive and important work of Stiles, although one cut was taken from Stiles and Hassall.

The next chapter, which is referred to on the title-page and in the preface as dealing with Mesozoa, distinctly repudiates that term and considers as separate appendices to the Platyhelminia the Rhombozoa, Orthonectida, Trichoplax, and Salinella. An extended note by the editor of the series adds here a valuable statement of recent results of importance which would have been welcome in other places also.

The final chapter, dealing with Nemertini, follows the work of Bürger closely. Two pages of addenda and corrigenda have been added by Mr. Punnett without doing more in the opinion of the reviewer than emphasizing the unfortunate delay in the appearance of the book. Scant justice is done some authors, and as striking a paper as that by Woodworth on Planktonemertes is entirely passed over.

There are some features which appear rather clumsy in American eyes, such as the use of Roman numerals to designate the figures, and the habit of beginning to number the figures anew in each chapter. One may justly say also that the figures are inferior to such as are used in this country to-day, and far behind those found in continental texts. As instances of the use of mediocre figures for forms of which good representations are easily accessible may be cited those of *Bothriocephalus* (p. 112) and *Echinococcus* (p. 131), while that of *Dipylidium* (p. 135) is little more than a caricature.

Much of the poor effect of the figures may be attributed to the author's inclination to use ideal or diagrammatic representations.

It is difficult to criticise fairly a work which, as the editor of the series says in a prefatory note, was written in 1897 and was entirely in proof in 1898. The epoch-making work of Looss on Trematoda and of Cohn and Lühe on Cestoidea, as well as many shorter contributions, have added so largely to our knowledge of these groups that what was thoroughly good in 1898 would now be strikingly out of date. One cannot help wondering how the work could have been held so long unpublished. In spite of these disadvantages, it will stand as a clear and well-balanced presentation of the subject, admirably arranged and suggestive in treatment.

HENRY B. WARD.

**Structure and Metamorphosis of Actinotrocha.** — In the *Journal of the College of Science of the Imperial University of Tokyo, Japan*, Ikeda<sup>1</sup> gives an account of studies on the development of Phoronis, from the unsegmented egg through the metamorphosis. For the earliest stages, the author was able to obtain living material in quantity, of the species *Phoronis ijimai*, while the structure of the larva was studied in four species (or forms) of Actinotrocha taken in the region of the Misaki Marine Biological Station.

The author gives some interesting details as to the life history of Phoronis, showing that the adults probably die every year, the colonies being completely replaced by the metamorphosing larvæ. He criticises the present classification of the species of Phoronis, holding that several of the so-called species are not really distinct.

A detailed account is given of the cleavage, gastrulation, formation and structure of the larva, and the transformation into the adult. Ikeda's results on some important or disputed points are as follows: The formation of the mesoblast begins at the beginning of gastrulation, by the irregular pushing of some of the entoblast cells into the cavity of the blastula. Mesoblast formation continues in the same manner from the two "anterior diverticula" of the archenteron, and from a ventral groove leading backward from the blastopore. The mesoblast cells are at first irregularly scattered, and only later arrange themselves to form the boundaries of the body cavities. The latter are thus not formed from enteric diverticula, as has sometimes been

<sup>1</sup> Ikeda, Iwaji. Observations on the Development, Structure, and Metamorphosis of Actinotrocha, *Journ. Coll. Sci. Imp. Univ. Tokyo, Japan*, vol. xiii, pp. 507-592, Pls. XXV-XXX.